

NAME_____

DATE_____ PERIOD_____

Practice Problems: Velocity & Acceleration

Directions: As always, show your work by (1) listing your givens and unknowns, (2) writing the equation, (3) plugging in the numbers and (4) putting a box around your final answer *with units!!*

Calculating Velocity

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

velocity = a speed with a _____

1. What is the velocity of a jet plane that travels 528 meters East in 4 seconds?

Distance =

speed =

=

Time =

Velocity = ?

2. What is the velocity of a rocket that travels 9000 meters up in 12.12 seconds?

3. Imagine you take a roadtrip from Philly to cape Canaveral, Florida. It takes 17 hours and the distance is 1000 miles. Calculate the average velocity for this roadtrip.

4. What is the velocity of a person walking south along a beach if he travels 1000 m in 20 minutes?

Calculating Distance

$$\text{distance} = \text{speed} * \text{time}$$

5. After an impact involving a non-functioning satellite, a paint chip leaves the surface of the satellite at a speed of 96 m/s. After 17 seconds, how far has the chip traveled?

Distance = ?

distance =

=

Time =

Velocity =

6. How far (in meters) will you travel in 3 minutes if you run at a rate of 6 m/s?

Calculating time

$$time = \frac{distance}{speed}$$

7. How long will your trip to New York City take (in hours) if you travel 90 miles at an average speed of 50 mi/hr?

Distance = time = =

Time = ?

speed =

8. The space shuttle Endeavor is launched to altitude of 500 km above the surface of the earth. The shuttle travels at an average rate of 700 m/s. How long will it take for Endeavor to reach its orbit? (Be careful with your units of distance, here!)

Calculating acceleration

$$acceleration = \frac{final\ velocity - original\ velocity}{time}$$

9. In 0.5 seconds, a projectile goes from 0 to 300 m/s. What is its acceleration?

Final velocity = acceleration = =

Original velocity =

Time =

Acceleration = ?

10. The space shuttle releases a space telescope into orbit around the earth. The telescope goes from being stationary (not moving at all) to traveling at a speed of 1700 m/s in 25 seconds. What is the acceleration of the satellite?

11. A racecar driver accelerated from stop to 60 m/s by the time it reached the finish line. The dragster moved in a straight line and traveled from the starting line to the finish line in 8.0 sec. What was her acceleration?

12. A meteoroid changed velocity from 1.8 km/s to 1.0 km/s in 0.03 seconds. What is the acceleration of the meteoroid?

KEY

Meteoroids and Orbital Debris Velocity and Acceleration Answer Sheet

1. $d=vt$ (distance = velocity multiplied by time)

 $d=9000 \text{ m}$
 $t=12.12 \text{ sec.}$
solving for v , $v=d/t$,

 $v=742.57 \text{ m/sec.}$
2. $d=vt$

 $d=528 \text{ m}$
 $t=4 \text{ sec}$
solving for v , $v=d/t$,

 $v=132 \text{ m/sec.}$
3. $d=vt$

 $v=96 \text{ m/sec.}$
 $t=17 \text{ sec.}$

 $d=1632 \text{ m}$
4. $d=vt$

 $d=500,000 \text{ m}$
 $v=700 \text{ m/sec.}$
solving for t , $t=d/v$,

 $t=714.3 \text{ sec.}(11.9 \text{ min.})$
5. $d=vt$

 $d=350,000 \text{ m}$
 $v=80,000 \text{ m/hr.}$
solving for t , $t=d/v$
6. $d=vt$

 $d=450,000 \text{ m}$
 $v=120 \text{ m/sec}$
solving for t , $t=d/v$,

 $t=3750 \text{ sec.}$
7. $d=vt$

 $d=1000 \text{ m}$
 $t=20 \text{ min.}(\underline{60 \text{ sec.}})$
 $=1200 \text{ sec.}$
min
solving for v , $v=d/t$,

 $v=0.83 \text{ m/sec.}$
8. $d=vt$

 $v=6 \text{ m/sec}$
 $t=3 \text{ min.}(\underline{60 \text{ sec.}})=180 \text{ sec.}$
min
 $d=1080 \text{ m}$
9. $d=vt$

 $d=816,000 \text{ m}$
 $t=10 \text{ hrs.}(\underline{60 \text{ min.}})(\underline{60 \text{ sec.}}) = 36,000 \text{ sec.}$
hrs min
solving for v , $v=d/t$,
10. $a=v/t$ (acceleration = velocity divided by time)

 $t=0.5 \text{ sec.}$
 $v=300 \text{ m/sec.}$

 $a=600 \text{ m/sec.}^2$
11. $a=v/t$

 $t=0.03 \text{ sec.}$
 $v=0.8 \text{ km/sec.}$

 $a=26.7 \text{ km/sec.}^2$
12. $a=v/t$

 $t=25 \text{ sec.}$
 $v=1700 \text{ m/sec.}$

 $a=68 \text{ m/sec.}^2$
13. $a=v/t$

 $t=8 \text{ sec.}$
 $v=60 \text{ m/sec.}$

 $a=7.5 \text{ m/sec.}^2$